

CLAIM AMENDMENTS

1. (Currently Amended) An irregular pattern reader comprising:
a prism including

a detection surface on which a subject to be detected, having an irregular pattern, is put, ~~and~~

a planar incident surface having a first angle of inclination relative to said detection surface, and

a planar emission surface having a second angle of inclination relative to said detection surface, said prism emitting emission light reflected from said detection surface at said planar emission surface and corresponding to incident light incident upon said incident surface, the emission light being substantially parallel to said detection surface;

a first optical system including a light source, light from the light source being incident on said incident surface of said prism, the light having an optical axis substantially parallel to said detection surface where the light is incident on said incident surface; and

a second optical system for transmitting the emission light emitted from said prism to an image pick-up device and including lenses having respective different magnifications in vertical and horizontal directions, each of said lenses converging the emission light in one of the vertical and horizontal directions to form an image on said image pick-up surface of the image pick-up device.

Claims 2-4 (Cancelled)

5. (Currently Amended) The irregular pattern reader according to claim ~~4~~10, wherein said ~~prism includes a~~ reflection surface ~~having~~ has a second angle of inclination relative to said detection surface, and light from said detection surface diverted at said reflection surface is emitted from said prism through said incident surface as the emission light.

Claims 6-8 (Cancelled)

9. (Currently Amended) The irregular pattern reader according to claim ~~3~~1, wherein said prism includes luminous flux converging means for converging the emission light on the image pick-up device.

10. (Currently Amended) ~~The~~ An irregular pattern reader ~~according to claim 4,~~
~~including an image pick-up device, wherein said~~ comprising:

a prism ~~includes~~ including

a detection surface on which a subject to be detected, having a irregular
pattern, is put,

a planar incident surface having a first angle of inclination relative to said
detection surface, said prism emitting emission light reflected from said detecting surface
and corresponding to incident light incident upon said incident surface, the emission light
being substantially parallel to and opposite in direction from the incident light, and

a reflection surface for reflecting the light reflected from said detection
surface; and

~~a lens portion receiving light reflected from said reflection surface and~~
~~directing the light to said second optical system, and an image pick-up surface of said~~
~~image pick-up device is substantially parallel to said detection surface~~

a first optical system including a light source, light from the light source being
incident on said incident surface of said prism, the light having an optical axis
substantially parallel to said detection surface where the light is incident on said incident
surface;

an image pick-up device; and

a second optical system for transmitting the emission light emitted from said prism
to said image pick-up device.

11. (Currently Amended) The irregular pattern reader according to claim ~~2~~1,
wherein the light reflected from said detection surface is reflected from said incident surface,
and emitted as the emission light through said emission surface.

12. (Previously Presented) The irregular pattern reader according to claim 1,
wherein the first angle is less than 45° and more than an angle obtained by subtracting an
angle of reflection at said detection surface from 90°.

13. (Currently Amended) The irregular pattern reader according to claim ~~4~~27,
wherein a region through which a luminous flux in said prism does not pass is omitted from
said prism at a surface facing said detection surface.

14. (Previously Presented) The irregular pattern reader according to claim 13, wherein said detection surface of said prism is approximately 20mm in width and approximately 15mm in length, and said prism is not more than 10mm in a thickness direction extending from said detection surface of said prism toward said image pick-up device.

15. (Currently Amended) The irregular pattern reader according to claim ~~10~~17, wherein said first optical system including said light source is located on an electronic substrate, and has a ~~second~~ collimator lens and ~~second~~ incident light turning means located between said light source and said ~~second~~ collimator lens, and incident light is incident upon said incident surface from said light source through said ~~second~~ incident light turning means and said ~~second~~ collimator lens.

① 16. (Currently Amended) The irregular pattern reader according to claim 15, wherein said ~~second~~ incident light turning means includes a transparent block, and an incident light emission surface of said ~~second~~ incident light turning means includes said ~~second~~ collimator lens.

17. (Currently Amended) The irregular pattern reader according to claim ~~16~~27, wherein said second optical system is located on the image pick-up surface of said image pick-up device.

18. (Currently Amended) The irregular pattern reader according to claim ~~17~~16, wherein said ~~second~~ incident light turning means is not more than 10mm in thickness.

19. (Currently Amended) The irregular pattern reader according to claim ~~10~~27, wherein a region through which a luminous flux in said prism does not pass is omitted from said prism at a surface facing said detection surface, said second optical system and said image pick-up device are respectively located on an electronic substrate, and each of the elements mounted on said electronic substrate has a thickness of no more than 10mm and a length no more than 35mm, and said detection surface of said prism is approximately 20mm in width and approximately 15mm in length.

20. (Previously Presented) The irregular pattern reader according to claim 19, wherein said image pick-up device is mounted as a bare chip on one of said electronic substrate and said second optical system.

21. (Currently Amended) The irregular pattern reader according to claim ~~22~~ 27, wherein said prism includes a ~~convex~~ concave reflecting surface reflecting to said emission surface light reflected from said detection surface.

22. (Currently Amended) The irregular pattern reader according to claim 21, wherein said ~~emission surface~~ lens portion is a cylindrical ~~and forms a lens surface~~.

23. (Currently Amended) The irregular pattern reader according to claim 21 including wherein said lens portion includes a toric lens mounted on the emission surface said prism.

24. (Currently Amended) The irregular pattern reader according to claim ~~22~~ 27, wherein said prism includes two reflection surfaces and the light reflected from said detection surface is reflected a second time from said incident ~~plane~~ surface and, sequentially, from each of ~~the~~ said two reflection surfaces and is emitted through ~~the~~ said ~~emission surface~~ lens portion.

Claim 25 (Cancelled)

26. (New) The irregular pattern reader according to claim 5, wherein said prism includes a reflection member on said reflection surface.

27. (New) The irregular pattern reader according to claim 10, wherein said prism includes a lens portion receiving light reflected from said reflection surface and directing the light to said second optical system, and an image pick-up surface of said image pick-up device is substantially parallel to said detection surface.

28. (New) The irregular pattern reader according to claim 27, wherein said reflection surface has a cylindrical reflection surface for converging in a horizontal direction the light reflected from said detection surface, and

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said lens portion includes a cylindrical lens for converging in a vertical direction,
transverse to the horizontal direction, the light reflected from said cylindrical reflection
surface.
